

## **SECTION 11190 PRE-ENGINEERED MODULAR STEEL CELLS**

### **PART 1 – GENERAL**

#### **1.01 WORK INCLUDED**

- A. This specification is intended for the provision of pre-engineered factory built Modular steel cells and associated items. This specification covers furnishing and installation of the above units including the labor, materials, equipment and services required for the complete fabrications, delivery and installation of the units to the proposed project.
- B. Refer to and coordinate with other sections of these specification for related Work, including electrical service, ventilation and plumbing services.
- C. These units shall be factory prefabricated, pre-engineered steel modular cell Units and associated items which are to be set in place at the project site. They are to be installed in the existing layout and configuration as reflected on the architectural drawings for the project.

#### **1.02 QUALITY CONTROL**

- A. Regulatory Requirements:
  - 1. All standards listed in this section reference United States codes and practices. Where required, apply national codes and standards which equal to or more stringent than those referenced.
  - 2. Except for more stringent requirements as indicated or imposed by governing regulations (which must be complied with), comply with applicable requirement of ANSI/ ASME Standards.
  - 3. CBC CODE: Comply with California Building Codes 2001 Edition and specifically with sections relating to electrical work.
  - 4. The modular assembly, must meet a United States Seismic Zone 4 or its national equivalent.
  - 5. The assembled units must attain a minimum noise rating for ( I I C ) impact isolation class of 50 and (STC) sound transmission class as certified by an acoustical laboratory.
  - 6. The interior and exterior panel finishes must comply with the specifications in Section 2.05 of this documents.

3. Schedule: Provide a written schedule of erection integrated with the fabrication and delivery schedule.

#### **1.04 PRODUCT HANDLING**

- A. The modular units shall protected with a weatherproof covering to prevent Damage during transportation.
- B. At time delivery on site of modular steel cells and associated items (or Portion thereof), the general contractor will provide suitable protective Covering, tarps, barriers, devices, signs or such other methods or procedures To protect modular steel cell work from damage or vandalism.
- C. Pre- installation Requirements
  1. It shall be the general contractors responsibility to have each steel unit under permanent roofing in a period of not then 30 days from the delivery to site.
- D. Completion: When all cell modules and associated items are delivered and installed on site a final check of each modular steel cell with the owner's personnel present shall be made.

#### **1.05 WARRANTY**

- A. Warranty: Provide special project warranty signed by contractor, installer Manufacturer agreeing to replace/repair/restore defective materials and workmanship of modular steel cell work during warranty period." Defective" is hereby defined to include, but not by way of limitation, operations or control system failures, performance below required minimums, excessive wear, unusual deteriorations or aging of material of finishes and unsafe conditions.
- B. The warranty period is 12 months starting on date of substantial completion.

### **PART 2 MATERIALS**

#### **2.01 GENERAL REQUIREMENTS**

Provide standard pre-engineered modular steel cells will fulfill requirements as specified herein.

#### **2.02 MATERIAL – STEEL**

- A. Material shall be as specified hereinafter. All material and equipment items Shall be new and shall be in first condition when delivery is completed.

- B. All steel in the fabrication of the modular steel cells shall be free from defects impairing strength, durability, or appearance, and of best commercial quality for purpose intended. All steel edges shall be free of burrs, sharp corners, roughness or other conditions, which could cause injury to persons or damage to roughness or other conditions, which could cause injury to persons or damage to other materials.

## **2.03 WELDING**

- A. Welding shall be done in a thorough manner using welding wire of the same composition as sheets or parts to be welded. Welds shall be strong, ductile, with excess metal ground off joints and finished smooth to match adjoining surfaces. Joints may be seamlessly welded by any acceptable process except that carbon arc welding will not be permitted. Butt joints provided with straps shall not be filled with solder.
- B. All welded joints shall be homogeneous with the sheet steel itself. Any form of welding permitting carbon pickup will not be acceptable.
  - 1. All welds shall be prime painted with a single coat of acrylic gray primer.
  - 2. All welds required to insure the performance of the cell construction shall be concealed so as to eliminate inmate access. Welding of walls, floors and ceilings on inmate accessible surfaces by any means of welding will not be acceptable.
  - 3. All workmanship shall be of the best quality of craftsmen skilled in their respective trades.

## **2.04 STEEL PANELS**

- A. All wall and ceiling panels shall be pan shaped and fabricated using standard 11 gauge galvanized steel sheet. This is minimum gauge requirement.
- B. All exposed cell front panel covers will be fabricated of 11 gauge galvanized steel sheets.
- C. All material used in fabrication of panels shall be free from defects impairing strength, durability or appearance and of best commercial quality for purpose intended.
- D. All panels will be fastened to each other and the structural framing by means of strength, conventional nut and bolting. Exposed hardware will be tamperproof of type fasteners requiring special tools for removal.

## **2.05 FINISHES**

- A. All interior and exterior panels shall be finished using a two-part-ply-mastic Epoxy coating (epoxy-polyamine coating), which is molecularly bonded or chemically grafted to the steel substrate, providing a strong and permanent finish. The finished coating shall be resistant to scratches, abrasion, impact, urine, salt, air and other chemicals.
- B. The coating shall be factory applied using approved methods as Recommended by coating manufacturer.
  - 1. Materials: The coating formulation for application onto galvanized and/or galvanized steel shall use technology of chemical grafting that involves the use of monomers, prepolymers, catalyst and grafting initiator system along with essential colored pigments. When applied onto galvanized steel, the coating shall obtain grafting polymerization on the steel surface, thereby giving strong adhesion to the substrate.
  - 2. Application: The Coating must be applied by spraying. The viscosity of this formulation can be adjusted accordingly with suitable thinner. After the application, the coated parts are subjected to a cure at 350 degrees F for 20 minutes. The coating can be applied without the pretreatment of the steel surface.
  - 3. Stability:
    - a. Corrosion resistance: Meets ASTM B117 test requirements for corrosion resistance to 240 hours when tested in 5% spray chamber at 95 degrees F.
    - b. Impact resistance: In accordance with ASTM specification D-2794-69 at impact of 160 inch/pounds, no failure of the coating in terms of cracks or chipping is observed during deformation of the substrate.
    - c. Abrasion resistance: The coat shall be highly resistant to abrasion and wear and will conform to falling sand abrasion ASTM D4060-81: 7585 mg. Loss (CS-17 Wheel; 1kg. Load, 1000 cycles)
    - d. Accelerated Weathering, QUV (ASTM G52-83): 1000 hours. No through rusting, blistering or loss of adhesion. Weather to an attractive matte finish.
    - e. Immersion, Salt & Fresh Water: Passes two years immersion in both fresh and salt (5% sodium chloride solution) water, No loss adhesion, through (ASTM D610-85) or blistering beyond 1/16" from scribe (ASTM D1654-79a).

- f. Humidity (ASTM D2247-68): 1000 hours. No through rusting, blistering or loss of adhesion.
  - g. Flexibility: No cracking or loss of adhesion. Maryland DOT SP2-15.02 (Coating cured 2 weeks@ 75degrees F, then bent uniformly around 6" diameter mandrel). Substrate: SSPC-SP-5 Steel Panel 4" by 30" by 1/8").
4. Characteristics: The coating highly resistant to:
- a. Scratch from knife, nail or any hard pointed object.
  - b. Impact, no cracks or peeling of paint.
  - c. Corrosion
  - d. Abrasion and wear
  - e. Urine
  - f. Commercial cleaning fluids.
5. Interior walls and ceiling will be using a coating of which the architect will select the color.
6. Cell front wall panels will be finished in a color as selected by the architect.
7. Cell floors shall be 11 gauge galvanized steel and shall have Marathon Classic Rubber detention grade tile or Norament 825 C Round, Article 1902, Raised Round Pastilles Resilient Tile Flooring.

## 2.06 INSULATION

- A. All wall, floor and ceiling panels of each unit will be fully insulated using Thermafiber Industrial Mineral Wool with an eight (8) PCF minimum density or equal. All insulation must be glued in place using a water based acrylic emulsion, pressure sensitive adhesive.
- B. Insulation will provide minimum thermal insulating values as shown below:
- |                                     |            |
|-------------------------------------|------------|
| Front & rear wall panels            | R16Minimum |
| Composite side panels between cells | R16Minimum |
| Composite floor & ceiling panels    | R16Minimum |
| Individual floor panels             | R8Minimum  |
| Individual ceiling panels           | R8Minimum  |
- C. All insulated cell wall for non-fire rated cells will be completely with Standard 20 gauge minimum galvanized steel skin attached to panel flanges.

## 2.07 HARDWARE:

All panels will be fastened to each other and also the structural framing by means of conventional nut and bolting. Exposed hardware will be tamper proof type fasteners requiring special tools for removal.

## **2.08 CONSTRUCTION – GENERAL**

- A. The modular steel cells shall be fabricated as herein specified in accordance with the following procedures.
- B. Fabricate modular steel cells with necessary provisions for hoisting of Completed units into place. Any hoisting appendages shall be or concealed from view, once the units are installed, and no evidence of same shall be exposed.

## **2.09 TUBULAR FRAME**

Dimensions: (Vertical: 3" x 5" x 14" thick wall) ( Horizontal: 2" x 5" x ¼" thick wall).

- A. Structural frame shall be constructed using tubing conforming to requirements Of ASTM A500 Grade B.
- B. Tubing will be welded to form square rigid and true frame. All welds on Exterior surfaces will be ground smooth to avoid interference with finishing Panels and stacking of units in field.
- C. Horizontal members will have 16 gauge galvanized steel angle clips welded to structural framing as required in Section 3.07 of this specification.
- D. All structural components shall be prime painted with an enamel primer on all Inside and outside surfaces. Application of coating shall be in a manner to ensure the thorough coating of all surfaces.

## **2.10 SECURITY WINDOWS, DOORS AND FRAMED OPENINGS**

- A. All window, door and framed opening will be of an equivalent security level To the wall framing in which they are to be moved.
- B. Hollow metal sliding/swing doors as manufactured by Mark Solutions Inc,
  - 1. Southern Steel, Folger Adams, Airtec, Track Set or equal for sliding doors
  - 2. Dead lock for swing door Southern Steel, Folger Adams, Airtec, or Equal.
  - 3. 5" x 24" Door Vision Panel with ½ " clear Lexan glazing.

4. Raised Door Pull for ease of operation on heavy doors and/or heavy traffic areas on dayroom side of door.
5. Recessed Door Pull for easily manipulating large heavy doors on Inmate.

All internal framing members of detention hollow metal doors will be constructed of 11 gauge C channels forming a continuous perimeter and joints will be completely seam welded. Intermediate 11 gauge formed galvanized steel C channels will be placed 9 inches AFF and then space 12 inches on center. They will be continuous seam welded around C channel door framing.

5" x 24" vision panel will be framed with 11 gauge galvanized formed C channels and fastened to become an integral part of the internal door structure. Glazing stops will be constructed of 11 - gauge galvanized 90-degree angles fastened with 1/4-20 security button head screws. Glazing and gaskets to be per approved specification with security screws.

All detention hardware will be secured by welding 1/4 inch thick ASTM steel plate stiffeners to door substrate members. All detention hardware will be fastened per specification with security screws.

All 14 gauge door skins shall be spot welded to internal door frame filled with compressed 8 pound mineral wool, compressed with an outer 14 gauge galvanized steel skin that is plug welded to an internal door frame and ground smooth. All doors edges will be ground smooth and of a continuous solid form construction.

All detention hollow metal doors will be disabled accessible. The outside dimension will be 3' 0" wide x 6' 7 1/4 "high.

C. Hollow metal door frames as manufactured by Mark Solutions Inc.

Hollow metal doorframes will be manufactured from 11 gauge galvanized steel. Frames will be integral part of the front wall panel with no removable stops. Hinge pockets are to be reinforced with 1/4 hinge supports spot welded to integral hollow metal frame. Individual or removable doorframes will not be permitted. Transom panel will be bolted 9" on center as well as track welded to doorframe. Doorframes are to be covered with 11 gauge galvanized front skins tack and plug welded to frame member

## 2.11 PANELS

- A. General: All individual panels shall be pan shaped, with all edge stiffeners, Flanges and returns formed from a single units of 11 gauge galvanized steel. Panels shall not be manufactured by attaching stiffeners, flanges or other material to a flat sheet. Panel seams within the cell created by edge butting flat sheet edges shall not be

permitted. All panel edges, knockouts, notches and holes shall be solvent cleansed with mineral spirits and primed with a single coat of acrylic gray primer.

- B. All panels shall be sandwich type, with panel filled with Thermafiber Industrial Mineral Wool insulation glued in place with a sound –deadening adhesive. Insulation in non-fire rated cells shall be held in place by a 20 gauge galvanized steel sheet, which will cover the insulation.
- C. Wall Panels: Fabricated 11 gauge galvanized steel.
  - 1. Panels reinforced with 11 gauge steel stiffeners as required. All wall panels are notched top and bottom to fit between horizontal framing members to provide additional support to structural frame.
  - 2. Side wall panels 2" thick, individual panels with a composite of 6" Overall, channels formed on sides; with 1 return top and bottom.
  - 3. Rear walls 4 1/4" thick minimum, formed same as sidewalls.
  - 4. Front wall panels 7" thick minimum, formed same as sidewalls.
- D. Ceiling panels 11 gauge galvanized steel formed same as sidewall panels.
- E. Floor panels: Floor panels shall be 11 gauge galvanized steel pan shaped panels. Steel panels will have recessed lancing seven (7) inch on center in the vertical, thirteen (13) inch on center in the horizontal. Lancings will be engaged by eleven (11) gauge galvanized steel (2) inch formed C channel. C channels stiffener will be spot welded to the face of the floor panels. The floors will be finished on the interior side with Marathon Classic rubber detention grade tile flooring or Norament 825 C Round, Article 1902, Raised Round Pastilles Resilient tile flooring. Slope floor to drain as shown on drawings.

## **2.12 CHASE DOOR**

- A. Chase Door: Fabricated from 11 gauge galvanized steel.
- B. Door will be 24" x 80" high to provide full chase access and to sit and cover opening in same manner as previously specified for hinged entry door. Two piano hinged doors. One will have a secured chase lock and the adjacent door will have two sliding dead bolts welded to frame members to entry to chase.
- C. Door face will be flat panel suitably notched to receive Southern Steel, Folger Adams, Airtec, Dead Lock or equal.
- D. Secure panel to 11 gauge galvanized steel channel welded top and bottom to

The structural frame. Door hinge 14 stainless steel continuous piano hinge bolted to one channel to support the door with standard nut and bolt.

## **2.13 MISCELLANEOUS**

- A. Miscellaneous items of hardware, fastening and like items are to be required By steel cell manufacturer to produce the cell.
- B. All exterior surfaces shall be protected with an approved weatherproof \front finish coat covering or coating during transportation.

## **2.14 INTERIOR EQUIPMENT AND ACCESSORIES**

### **A. General**

All specified equipment and accessories to be installed as per manufacturer's directions and instruction. All interior equipment and accessories shall be protected wherever possible from damage during fabrication, transportation, construction, and storage. The equipment and accessories shall be as specified herein and in accordance with the following procedures and standards.

### **B. MIRROR/FRAME**

Mirror and frame shall be secured to chase wall panel using security fasteners. Mirror to be one piece type 340 stainless steel with No. 8 polished finish.

### **C. ADA COMPLIANT COMPACT COMBINATION TOILET/SINK/ DRINKING FOUNTAIN**

Fixture shall be fabricated from 14 gauge, type 304 stainless, Construction shall be seamless welded and exposed surfaces shall have a satin finish, 36 " long stainless steel grab bar to be located behind toilet, Hydraulic operated, metering, non hold open pushbottom flush valve supplied and installed by plumbing contractor. Valve shall require less than 5lbs. to activate. Toilets shall be blowout jet type with type with an elongated bowl, a self-draining flushing rim, and an integral contoured seat with a sanitary high polish finish. Toilet trap shall pass a 2 5/8" diameter ball and be fully enclosed. Cabinet interior is sound deadened with fire resistant material. Fixture shall withstand loading of 5, 000 lbs, without permanent damage. The following will all be supplied and installed by the plumbing contractor: hot and cold Airtrol Valves with individual check stops, supply lines and connections, P-traps, hydraulic flush valve and waste outlet (to be 3") and connections.

### **D. Stool:**

Stool fabricated from eleven (11) gauge galvanized steel. All edges are to be welded and ground and smooth. The stool will be fastened with six (6) security hex head bolts. The stool will be supported by eleven (11) gauge stiffeners formed into four (4) inch C channels, 5/16-18 well nuts to be welded to wall stiffener for stool attachment. The stool will be painted to match the interior of the cell.

E. Security Clothes Hook (4Hooks):

One-piece security (institutional safety) clothes hook with shelf, Installed using ¼-20 security fasteners.

F. Bench

1. Bench shall be 18" length shown on drawings. Three benches per cell.
2. Fabricated from 11 gauge galvanized steel. Bench will be formed from one continuous 11 gauge sheet with 2" returned bends that are hemmed on all exposed edges. All edges of benches will be welded and ground smooth.
3. Benches will be fastened with 3/8 – 16 security fasteners.
4. Finish shall match interior walls.
5. Where bench mounts within 1" of panel seams, an 11 gauge channel stiffener added to the panel construction shall be deemed adequate to safely support the bunk.
6. Where the bench mounts other than the above, the wall panel shall be stiffened within. The bench shall be fastened through the wall panel and directly to the stiffening member. The minimum stiffening member allowed shall be a C4 x 7.32 structural channel. Under no circumstances shall non-symmetric members (i.e. angle sections) be used due to their lack of rotational stiffness. Stiffeners supporting the bench will be welded directly to the structural frame at both the top and bottom ends of the stiffener.

G. Sprinkler Head:

Rough-in on chase wall for sprinkler head which will be supplied and installed by plumbing contractor.

H. Floor Drain:

Rough-in on floor for floor drain which will be supplied and installed by plumbing contractor.

## 2.15 ELECTRICAL WORK

### A. Description:

#### 1. The work under this section shall consist of the following:

- a. Furnishing and installing conduits, pull strings, outlet and junction boxes for all electrical wiring in the modular cells. All wiring will be supplied and installed by the electrical contractor.
- b. Lighting fixture in modular steel cells and associated items including lamps as required.
  - a. General Requirements:
    - i. Code – All electrical materials and equipment furnished under this section shall be new and conform to the applicable requirements of the California Electric Code (Current Edition), the rules and regulations of the utility company and all applicable state codes, to these specifications. Materials, sizes and methods of construction not herein specified shall be at least equal to or better than the code standards.
    - ii. Certification – All electrical materials, including installed equipment shall bear the label of the Underwriters Laboratories, Inc. or equivalent.
    - iii. Corrosion Protection – To prevent deterioration due to corrosion, bolts, nuts, studs, screws, terminal springs, and similar fastenings, fittings and hardware shall be of brass, bronze, copper or stainless steel.

### B. Conduits:

Conduit shall be ¾" diameter flexible conduit, wire and boxes required within the cell to be terminated within the cell chase at junction box mounted to chase wall.

### C. Lighting:

Maximum security light fixture with 14 gauge cold rolled steel formed construction with seams welded and ground smooth. Door frame is secured to inner structure with tamperproof, plated steel captive flush bolts. Inner structure die-formed of 16 gauge galvanized. An internal 16 gauge CRS continuous length piano hinge joins the outer housing to the inner structure. Shielding is .250" ultraviolet stabilized polycarbonate and .125" prismatic acrylic overlay. Three 32 watts lamps, 120 volt ballast and PL7 night light. Mark lighting, or equal.

## **PART 3      EXECUTION**

### **3.01    INSTALLATION**

- A.    Hoist modular steel cells and associated items into place in coordination with the erection of the building framing system by the building contractor.
- B.    Level all units as required.

**END OF SECTION**



